

## 9. BEACH Monitoring Program - Virginia Department of Health

### (1) Introduction

The “Beaches Environmental Assessment and Coastal Health (BEACH) Act” of 2000 amended Section 303 of the Federal Water Pollution Control Act (33 U.S.C. 1313) by specifying monitoring and reporting requirements for pathogens and pathogen indicators in coastal recreational waters for the purpose of protecting public health and welfare. One requirement of this Act was the publication of a list of “*discrete coastal recreation waters adjacent to beaches or similar points of access that are used by the public.*” The resultant [National List of Beaches](http://water.epa.gov/type/oceb/beaches/list_index.cfm) [http://water.epa.gov/type/oceb/beaches/list\_index.cfm] was originally published by the U.S. EPA in 2004, and more recently updated in 2010. The EPA National List Webpage now indicates that...“Starting with the 2011 swimming season, the list became available in a dynamic format that links to EPA’s Beach Advisory and Closing On-line Notification (BEACON) system, where further details about each beach can also be found.” The requirements of the BEACH Act apply only to states and tribes that have coastal recreational waters, defined by the Clean Water Act (Section 303c) as the “...*Great Lakes and marine and estuarine coastal waters that are designated by a state or tribe for use for swimming, bathing, surfing, or similar water contact activities.*...”

Virginia’s [BEACH Monitoring Program](http://www.vdh.virginia.gov/epidemiology/DEE/BeachMonitoring) [www.vdh.virginia.gov/epidemiology/DEE/BeachMonitoring] was initiated in 2002 by the Division of Environmental Epidemiology (DEE) of the Virginia Department of Health (VDH). In addition to the immediate reporting and public notification requirements relative to swimming advisories, results obtained by VDH are communicated to DEQ for inclusion in the agency’s biennial Integrated 305(b)/303(d) Water Quality Assessment Reports. The specific formats for the transfer of BEACH-related data between the two agencies, and the specific data analysis methodologies to be applied during the biennial assessment process were first defined by DEQ and VDH during 2005, and the latest version is described in the [Assessment Guidance Manual](http://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/WaterQualityAssessments.aspx) for the most recent 305(b)/303(d) Report. [http://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/WaterQualityAssessments.aspx]

Section 5.2—Evaluation of Designated Uses” of the guidance manual defines ‘*Recreation/Swimming Use*’ as including swimming and other primary and secondary water contact recreation uses such as water skiing and pleasure boating. Normally, support or lack thereof of this use is based on a comparison of *E. coli* and *Enterococcus* bacteria data to the instantaneous standard using the > 10.5% percent assessment method. However, if a special study, designed to collect at least 4 weekly bacteria data points within a calendar month, is conducted, such as in the BEACH program, then these results should be compared to the geometric mean criterion described in 9 VAC-25-260-170. Additionally, any VDH beach closures/swimming advisories should be assessed according to Section 5.2 of the guidance manual, which provides orientation on assessments of ‘*Fully Supporting*’, ‘*Fully Supporting but Having an Observed Effect*’, or ‘*Pollutant Caused Impaired Waters Needing a TMDL*’, based on beach closures and/or swimming advisories.

The BEACH Monitoring Program in Virginia is designed to provide seasonal monitoring of coastal waters adjacent to beaches within the Commonwealth. A public bathing beach is defined by the Code of Virginia (1980, c.428, §10-217, 10.1-705) as “*a sandy beach located on a tidal shoreline suitable for bathing in a county, city or town and open to indefinite public use.*” Based on these characteristics, forty-five public beaches were identified prior to December 2003. [Virginia’s BEACH Program currently monitors 46 beaches](#) [III-C-9-2.doc].

The process for identifying and enumerating individual beaches is discussed below, in the section on 'siting.' The localities participating in this program include the cities of Virginia Beach, Norfolk, Hampton, Newport News, and Yorktown, Mathews, King George, Gloucester, Northampton, and Accomack Counties.

## **(2) Purpose**

The purpose of this program is to reduce the risk of swimmers contracting disease or infection. The program accomplishes this by using public notification and risk communication to protect human health. Weekly monitoring is conducted to determine if levels of fecal indicator bacteria (*enterococci*) meet the requirements of the State Water Quality Standards.

## **(3) Monitoring Design**

### **(a) Siting**

The number of sampling stations at a beach is based on EPA guidance available at the following website: <http://www.epa.gov/waterscience/beaches/grants/guidance/index.html>. Procedures for siting and enumerating individual beaches is based on beach size and whether (1) it is small and is treated as a single entity for swimming advisories, or (2) if it is more extensive and individual sections may be closed independently. In summary, the current list of responsible health districts and beaches includes:

1. Rappahannock Health District (Fairview Beach) - 1 beach
2. Peninsula Health District (Newport News, Yorktown) - 5 beaches
3. Hampton City Department of Health - 3 beaches
4. Norfolk Department of Public Health - 10 beaches
5. Virginia Beach - 22 beaches
6. Three Rivers Health District (Gloucester Point, Festival Beach) - 2 beaches
7. Eastern Shore Health District - 3 beaches

Total = 46 beaches

Samples are taken in the middle of a typical bathing area. If the beach is short, samples are taken at a point corresponding to each lifeguard chair or one sample for every 500 meters of beach. Sample results from multiple sites at the same beach may be united into a single arithmetic average for comparison with the Water Quality Standard and evaluation for swimming advisories, see below. If the beach is long (more than 5 miles) samples are spread out along the entire beach. Locations of sites are identified by coordinates of latitude and longitude and remain uniform from year to year in order to maintain a permanent, long-term database on beach water quality.

The most updated information relative to the BEACH Monitoring Program, including maps of sampling sites, historical results, and swimming advisories, may be found on the [VDH WebPages](http://www.vdh.virginia.gov/epidemiology/DEE/BeachMonitoring) [<http://www.vdh.virginia.gov/epidemiology/DEE/BeachMonitoring>].

### **(b) Frequency**

Beaches are sampled for indicator bacteria on a weekly basis from mid-May through September. When the Water Quality Standard at a specific beach is exceeded, or when the results of bacterial analysis are inconclusive, follow-up sampling is repeated as soon as possible.

### **(c) Sampling**

In accordance with EPA guidance, samples are collected 0.3 meters below the water surface in knee-deep water (approximately 0.5 meters). VDH's [2012 Quality Assurance Project Plan](#) [III-C-9-5.doc] provides general guidelines for sampling procedures. Samples are placed on ice and are delivered to the laboratory for analysis within six hours of collection.

Samples are collected on the regular monitoring day, rain or shine, unless conditions are dangerous to sampling staff. If a decision is made not to sample because a violation of the standard is expected (e.g., heavy storm drain overflow), the beach is posted with a swimming advisory. Samples are collected and transported in the same way at all sites. All samples are grab samples, using sterile bottles that are supplied by the laboratory performing analysis.

When continued exceedances occur at monitoring locations, samples may be collected for Microbial Source Tracking analysis by the Department of Crop and Soil Sciences at Virginia Polytechnic Institute and State University. The results of this analysis provide an indication of the source of fecal pollution. Varying sources of pollution have shown to provide different levels of health risk to water users.

### **(d) Duration**

Beach monitoring sites are considered permanent, fixed sites of the VDH BEACH Monitoring Program. Sampling will continue as long as funding and resources are available. As mentioned above, the sampling is restricted to the mid-May through September swimming season.

### **(4) Core and Supplemental Water Quality Indicators**

The indicator organism used for estuarine and marine beaches are bacteria of the genus *Enterococcus*. Laboratory analysis of *enterococci* in beach water samples is conducted using EPA approved methods. Additional measurements of air and water temperature, dissolved oxygen, pH and salinity are also taken at each beach site during each visit.

### **(5) Quality Assurance**

VDH's 2012 [Quality Assurance Project Plan](#) [III-C-9-5.doc] was updated by VDH and approved by EPA in November 2012. Sampling methods are based on sections 9060A and 9060B of the Standard Methods for the Examination of Water and Wastewater (APHA 2012). Standard Procedures for laboratory analyses of water samples for *Enterococci* are provided by the laboratories performing the service and are also included in the Quality Assurance Project Plan. As mentioned above, VDH also provides uniform guidance for interpreting sample results in the [Beach Monitoring Protocol](#) [III-C-9-3.doc].

Annual training is provided for all field personnel and their supervisors. Training consists of sample collection and handling, data management, results interpretation, operation and calibration of equipment, and current program issues, updates, and quality assurance objectives.

### **(6) Data Management**

VHD receives weekly results from laboratories by email, fax, and/or conventional mail. Timely data submission is emphasized so that the VDH BEACH Websites can be updated as soon as results are available. Timely data submission is mostly critical when exceedances occur and swimming advisories need to be issued. Upon receipt of results, VDH local health district staff enters laboratory results into a VDH database. When results are entered, swimming advisories are posted on VDH's BEACH Monitoring Website for public notification.

Data are periodically sent to EPA, via CDX for STORET, in an XML schema utilizing formats specified in EPA's [Beach Monitoring Data User Guide](#) [III-C-9-4.pdf]. VDH provides BEACH monitoring and notification data to EPA annually.

### **(7) Data Analysis / Assessment**

**Swimming Advisories:** VDH compares beach water sample results to the Virginia Water Quality Standard for *enterococci*. The results from several simultaneously collected samples at the same beach may be united into a single arithmetic average for comparison with the Standard, and for subsequent evaluation for issuing swimming advisories. The Single Sample Maximum for *Enterococci* is 104 colony forming units (cfu) / 100ml. Samples above this level are in violation of the Virginia Water Quality Standards. One sample exceedance of the Single Sample Maximum standard is sufficient to issue a swimming advisory.

If there is a violation of the standard, the site is posted with an appropriate swimming advisory sign and procedures for contacting the locality where the beach is located are followed. A press release is issued to notify the public, and a follow-up sample is taken and delivered to the lab as soon as possible. Procedures for this process are documented in the VDH [Quality Assurance Project Plan](#) [III-C-9-5] and [Beach Monitoring Protocol](#) [III-C-9-3].

**305(b)/303(d) Assessment and Reporting:** The specific 305(b) assessment methodologies for using (1) swimming advisories and/or (2) the *enterococci* concentration data from the BEACH Monitoring Program were defined in 2005 and incorporated into the [Assessment Guidance Manuals](#) for the 2006 and all subsequent Integrated 305(b)/303(d) Reports. They are also described in Chapter II – D, Designated Uses, Use Criteria, and Use Attainment of Water Resources in this (WQM Strategy) document.

### **(8) Reporting**

If sample results exceed the Water Quality Standard, the beach is posted with a swimming advisory sign, the public is notified through press releases to local newspapers, and an advisory is posted on the [VDH BEACH Monitoring website](http://www.vdh.virginia.gov/epidemiology/DEE/BeachMonitoring/) [http://www.vdh.virginia.gov/epidemiology/DEE/BeachMonitoring/].

Sample results and public notification data are submitted to EPA annually as required. Data collected by the BEACH Monitoring Program are also communicated to DEQ for use in the agency's biennial Integrated 305(b)/303(d) Report.

### **(9) Programmatic Evaluation**

VDH participates in biweekly conference calls and annual meetings with EPA to review the BEACH Monitoring Program in Virginia. The program is grant funded, and reviews of the yearly proposals, progress reports, and database submissions are mechanisms for programmatic evaluation by EPA. Within VDH, there is routine communication between the Division of Environmental Epidemiology and the participating health districts, and weekly reviews of data from each participating health district are performed by Virginia's BEACH Coordinator and/or support staff.

### **(10) General Support and Infrastructure Planning**

The BEACH Monitoring Program is a federally funded program. Yearly budgets are prepared well in advance to meet proposal submission deadlines established by EPA. Future changes in methodologies will depend upon EPA recommendations, and expansion of the current program may occur in response to the opening of new public beaches or their identification by local health districts.

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